

On Hæmoglobin Metabolism in Malarial Fever. (Preliminary Note.)

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The object of this study was to examine some of the cases of malaria reported upon by Major R. Ross and Dr. David Thomson in their paper on "Enumerative Studies on Malarial Fever," with especial reference to the meaning of the fall of hæmoglobin there recorded during pyrexia, in the ultimate hope that some light may thus be thrown on various problems connected with malaria, and especially with blackwater fever.

The chief product of hæmoglobin metabolism, and the only one available for quantitative work, is the urobilin which is removed from the body partly in the urine, partly in the fæces. Previous observers have devoted much attention to the quantitative determination of urinary urobilin in health and disease, and have shown that it is increased in diseases connected with pyrexia and with hæmolysis. In benign tertian malaria the urinary urobilin is excreted in quantities comparable to those in other diseases. In malignant tertian malaria the excretion of urobilin in the urine is somewhat higher. Occasionally very marked urobilinuria occurs.

The main channel of elimination of urobilin, however, is the fæces, and this fact has been somewhat neglected in comparison with the urinary estimations. Serious difficulties are met with owing to variations in composition of fæcal urobilin. The amount of urobilin in the fæces nearly always completely overshadows that in the urine. In our cases of benign tertian malaria, the excretion of fæcal urobilin is again found to be comparable to that in other pyrexial diseases. In malignant tertian malaria, however, a high output is the rule, and occasionally a very large output occurs. This is of importance as showing that great hæmolysis has occurred and that an amount of hæmoglobin (25 per cent.) has been destroyed (and its products excreted) comparable to the fall recorded by the hæmoglobinometer; this shows that the hæmoglobinometer readings denote an actual destruction of corpuscles, and not merely a relative fall in the peripheral circulation. The number of corpuscles destroyed is much larger than the number infected by parasites.

The eliminating organs deal with a large amount of hæmoglobin during the pyrexial periods and the days which immediately follow; this would seem to indicate a continual loading of the blood plasma with freed hæmo-

globin ; but the amount of hæmoglobinæmia is kept below that necessary to produce hæmoglobinuria by the continuous activity of the liver.

In a case of blackwater fever examined by Major Ross, Dr. Thomson, and myself, the faecal excretion of urobilin reached an astonishing figure, representing practically the elimination of an amount of hæmoglobin equal to the whole of the circulating blood. This was accompanied by slight urobilinuria and very slight hæmoglobinuria, showing that the hæmoglobinuria of blackwater fever is apparently only an overflow from the normal channel of excretion, and that the hæmolysis has reached an exceptional figure. Further studies are being made on the subject.

Colour-Blindness and the Trichromatic Theory of Colour Vision.
Part II.—Incomplete Red or Green Blindness.

By Sir W. DE W. ABNEY, K.C.B., F.R.S.

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*On the Sensibility of the Eye to Variations of Wave-length in the
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By Lord RAYLEIGH, O.M., F.R.S.

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